TODO TITLE*

Reproducing 'Taking It to the Next Level'

Amy Farrow

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Abstract

TODO ABSTRACT

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2 Data

Table 1 shows summary statistics for key variables identified by Robinson et al., including missing values. The variables are as follows:

- s1_sim: Immediately after the treatment or placebo, students answered six questions about their perceived similarity to the instructor, on scales of 1 to 5. These responses were averaged to create a similarity scale.
  - Overall, how similar to your instructor's values do you think your values are?
  - How similar are your goals for the course and your instructor's goals?
  - In general, how similar do you think your views about the course content and your instructor's are?
  - How much do you think you have in common with your instructor?
  - How similar do you think your personality is compared to your instructor's?
  - Overall, how similar do you think you and your instructor are?

*Code and data are available at: github.com/amycfarrow/takingittothenextlevelrepro.

Table 1: Descriptive statistics for treatment and control groups

treatment	N	Missing		Control	Treatment	Total
				N(%) = 1388 (50.5)	N(%) = 1361 (49.5)	N(%) = 2749
s1_sim	2658	91	Mean (SD)	3.5 (0.7)	3.6 (0.7)	3.5 (0.7)
s1_tsr	2749	0	Mean (SD)	4.1 (0.6)	4.1 (0.6)	4.1 (0.6)
s2_sim	2106	643	Mean (SD)	3.5 (0.8)	3.6 (0.8)	3.6 (0.8)
s2_tsr	2106	643	Mean (SD)	4.1 (0.8)	4.1 (0.7)	4.1 (0.8)
t2_sim1	2548	201	Mean (SD)	2.7 (1.1)	2.7 (1.0)	2.7 (1.1)
t2_tsr	2564	185	Mean (SD)	3.5 (0.9)	3.5 (0.9)	3.5 (0.9)
grade	2538	211	Mean (SD)	3.0 (1.1)	3.0 (1.1)	3.0 (1.1)
std_grade	2538	211	Mean (SD)	-0.0 (1.0)	0.0 (1.0)	0.0 (1.0)
t2_finalexam	2416	333	Mean (SD)	3.0 (1.1)	3.0 (1.1)	3.0 (1.1)
ir_f16_gpa	2577	172	Mean (SD)	3.0 (0.7)	3.0 (0.7)	3.0 (0.7)
f17_enrolled	2190	559	0	91 (8.3)	97 (8.9)	188 (8.6)
			1	1010 (91.7)	992 (91.1)	2002 (91.4)
s1_female	2615	134	0	533 (40.3)	510 (39.4)	1043 (39.9)
			1	788 (59.7)	784 (60.6)	1572 (60.1)

- s1_tsr: Immediately after the treatment or placebo, students answered seven questions about their perception of the instructor-student relationship, on scales of 1 to 5. These responses were averaged to create an ISR scale.
  - How much do you think you will enjoy learning from this instructor?
  - How friendly do you think this instructor will be towards you?
  - How encouraging do you think this instructor will be towards you?
  - If you came back to visit this instructor three years from now, how excited do you think they would be?
  - How motivating do you think you will find this instructor's class?
  - How caring do you think this instructor will be towards you?
  - Overall, how much do you think you will learn from this instructor?
- s2_sim: At the end of the semester, students answered the above six similarity scale questions again.
- s2_tsr: At the end of the semester, students answered the above seven ISR scale questions again.
- t2_sim1: At the end of the semester, instructors answered only one quesiton about similarity with the student, on a scale of 1 to 5.
  - Overall, how similar do you think you and STUDENTNAME are?
- t2_tsr: At the end of the semester, instructors answered seven questions about their perception of the instructor-student relationship, on scales of 1 to 5. These responses were averaged to create an ISR scale.
  - How much did you enjoy helping STUDENTNAME learn?
  - How caring was STUDENTNAME towards you?
  - How often did you say something encouraging to STUDENTNAME?
  - How friendly was STUDENTNAME towards you?
  - If this student came back to visit you three years from now, how excited would you be?
  - How motivating did STUDENTNAME find the activities that you plan for class?
  - Overall, how much did STUDENTNAME learn from you?
- grade: The final grade that the student received in the course. These were not reported by the student.
- std_grade: The student's final grade, standardized against other grades in the course.
- t2_finalexam: Instructors were asked to report the student's grade on their final exam, paper, or project.
- ir_f16_gpa: The student's cumulative GPA after the Fall 2016 term.
- f17_enrolled: The student's status as of Fall term 2017: not enrolled or enrolled.
- s1_female: The student's gender.

Table 2: Descriptive statistics and correlation matrix for key continuous variables

	N	Missing	Mean (SD)	s1_sim	s1_tsr	s2_sim	s2_tsr	t2_sim1	t2_tsr	grade	std_grade	t2_finalexam	ir_f16_gpa
s1_sim	2658	91	3.5 (0.7)	-									
s1_tsr	2749	0	4.1 (0.6)	0.67***	-								
s2_sim	2106	643	3.6 (0.8)	0.55***	0.49***	-							
s2_tsr	2106	643	4.1 (0.8)	0.41***	0.55***	0.79***	-						
t2_sim1	2548	201	2.7 (1.1)	0.14***	0.15***	0.23***	0.24***	-					
t2_tsr	2564	185	3.5 (0.9)	0.18***	0.2***	0.27***	0.31***	0.68***	-				
grade	2538	211	3.0 (1.1)	0.06**	0.11***	0.2***	0.23***	0.39***	0.46***	-			
std_grade	2538	211	0.0 (1.0)	0.01	0.02	0.11***	0.11***	0.31***	0.36***	0.81***	-		
t2_finalexam	2416	333	3.0 (1.1)	0.05*	0.1***	0.16***	0.18***	0.39***	0.45***	0.81***	0.63***	-	
ir_f16_gpa	2577	172	3.0 (0.7)	0.03	0.02	0.05*	0.05*	0.18***	0.2***	0.44***	0.42***	0.38***	-

3 Models

3.1 Reproduction models

$treatment_i$ is the indicator that treatment was given.

X_{1i} is a vector of student-level covariates (pre-intervention measures included).

X_{2j} is a vector of instructor-level covariates.

ϵ_{ij} is a clustered residual.

3.1.1 Linear models

Equation (1) is Robinson et al.'s linear model, used for continuous outcomes, which include immediate student similarity rating (s1_sim), end of semester student similarity rating (s2_sim), end of semester student ISR rating (s2_tsr), end of semester instructor ISR rating (t2_tsr), course grade (grade), and objectively graded exam grade (t2_finalexam).

$$Outcome_{ij} = \beta_0 + \beta_1 treatment_i + X_{1i}\Gamma_1 + X_{2j}\Gamma_2 + \epsilon_{ij} \tag{1}$$

3.1.2 Ordinal logistic models

Equation (2) is Robinson et al.'s ordinal logistic model, used for ordinal outcomes, which include end of semester instructor similarity rating (t2_sim1).

$$prob(outcome_{ij}) = a_k + \beta_1 treatment_i + X_{1i}\Gamma_1 + X_{2j}\Gamma_2 + \epsilon_{ij} > k \tag{2}$$

3.1.3 Logistic models

Equation (3) is Robinson et al.'s logistic model, used for binary outcomes, which include enrollment in Fall term 2017 (f17_enrolled).

$$prob(outcome_{ij}) = a_k + \beta_1 treatment_i + X_{1i}\Gamma_1 + X_{2j}\Gamma_2 + \epsilon_{ij} > k \tag{3}$$

3.2 Additional models

4 Results

4.1 Reproduction results

Table 2

Table 3: Effect of treatment on immediate student similarity rating

Dependent: s1_sim		unit	value	Coefficient (univariable)	Coefficient (multivariable)
treatment	Control	Mean (sd)	3.5 (0.7)	-	-
	Treatment	Mean (sd)	3.6 (0.7)	0.16 (0.10 to 0.21, p<0.001)	0.16 (0.10 to 0.21, p<0.001)

Table 4: Effect of treatment on end of semester student similarity rating

Dependent: s2_sim		unit	value	Coefficient (univariable)	Coefficient (multivariable)
treatment	Control	Mean (sd)	3.5 (0.8)	-	-
	Treatment	Mean (sd)	3.6 (0.8)	0.09 (0.03 to 0.16, p=0.007)	0.09 (0.03 to 0.16, p=0.007)

4.1.1 Linear models

Table 3

Table 4

Table 5

Table 6

Table 7

Table 8

4.1.2 Ordinal logistic models

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4.1.3 Logistic models

Table 10

4.2 Additional results

5 Discussion

Table 5: Effect of treatment on immediate student ISR rating, controlling for anticipated ISR

	Dependent: s2_tsr		unit	value	Coefficient (univariable)	Coefficient (multivariable)
2	treatment	Control	Mean (sd)	4.1 (0.8)	-	-
3		Treatment	Mean (sd)	4.1 (0.7)	0.01 (-0.06 to 0.07, p=0.864)	0.01 (-0.04 to 0.06, p=0.732)
1	s1_tsr	[1.3,5.0]	Mean (sd)	4.1 (0.8)	0.67 (0.63 to 0.72, p<0.001)	0.67 (0.63 to 0.72, p<0.001)

Table 6: Effect of treatment on end of semester instructor ISR rating

Dependent: t2_tsr		unit	value	Coefficient (univariable)	Coefficient (multivariable)
treatment	Control	Mean (sd)	3.5 (0.9)	-	-
	Treatment	Mean (sd)	3.5 (0.9)	-0.01 (-0.08 to 0.06, p=0.802)	-0.01 (-0.08 to 0.06, p=0.802)

Table 7: Effect of treatment on course grade, controlling for student gender and prior GPA

	Dependent: grade		unit	value	Coefficient (univariable)	Coefficient (multivariable)
5	treatment	Control	Mean (sd)	3.0 (1.1)	-	-
6		Treatment	Mean (sd)	3.0 (1.0)	0.04 (-0.05 to 0.13, p=0.360)	0.05 (-0.03 to 0.13, p=0.196)
3	s1_female	0	Mean (sd)	2.9 (1.1)	-	-
4		1	Mean (sd)	3.1 (1.0)	-	-
1	ir_f16_gpa	[0.0,4.0]	Mean (sd)	3.0 (1.1)	0.68 (0.62 to 0.73, p<0.001)	0.67 (0.61 to 0.73, p<0.001)
2	NA	NA	NA	NA	0.19 (0.10 to 0.27, p<0.001)	0.12 (0.04 to 0.20, p=0.003)

Table 8: Effect of treatment on objectively graded exam grade, controlling for student gender and prior GPA

	Dependent: t2_finalexam		unit	value	Coefficient (univariable)	Coefficient (multivariable)
5	treatment	Control	Mean (sd)	2.7 (1.2)	-	-
6		Treatment	Mean (sd)	2.7 (1.2)	0.02 (-0.18 to 0.22, p=0.816)	0.02 (-0.17 to 0.21, p=0.818)
3	s1_female	0	Mean (sd)	2.7 (1.3)	-	-
4		1	Mean (sd)	2.7 (1.2)	-	-
1	ir_f16_gpa	[0.0,4.0]	Mean (sd)	2.7 (1.2)	0.54 (0.42 to 0.67, p<0.001)	0.55 (0.43 to 0.68, p<0.001)
2	NA	NA	NA	NA	0.00 (-0.21 to 0.21, p=0.990)	-0.10 (-0.30 to 0.10, p=0.329)

Table 9: Effect of treatment on end of semester instructor similarity rating

Dependent: t2_sim1		1	2	3	4	5	OR (univariable)	OR (multivariable)
treatment	Control	163 (12.6)	412 (31.9)	453 (35.1)	186 (14.4)	76 (5.9)	-	-
	Treatment	155 (12.3)	400 (31.8)	445 (35.4)	186 (14.8)	72 (5.7)	1.03 (0.81-1.30, p=0.810)	1.03 (0.81-1.30, p=0.810)

Table 10: Effect of treatment on enrollment in next Fall 2017, controlling for student gender and prior GPA

	Dependent: f17_enrolled		0	1	OR (univariable)	OR (multivariable)
5	treatment	Control	68 (7.0)	909 (93.0)	-	-
6		Treatment	61 (6.3)	903 (93.7)	1.11 (0.77-1.59, p=0.576)	1.12 (0.77-1.63, p=0.540)
3	s1_female	0	61 (7.7)	730 (92.3)	-	-
4		1	68 (5.9)	1082 (94.1)	-	-
1	ir_f16_gpa	Mean (SD)	2.3 (1.0)	3.0 (0.7)	2.74 (2.23-3.38, p<0.001)	2.72 (2.21-3.36, p<0.001)
2	NA	NA	NA	NA	1.33 (0.93-1.90, p=0.119)	1.17 (0.80-1.70, p=0.405)